



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,154	11/16/2001	Morten Nissov	1020	3833

7590

12/28/2005

John P. Maldjian  
TyCom (US) Inc.  
Rm 2B-106  
250 Industrial Way West  
Eatontown, NJ 07724

EXAMINER

PHAN, HANH

ART UNIT

PAPER NUMBER

2638

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/991,154		NISSOV ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Hanh Phan		2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2001.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,15-17,19,20 and 22-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-13,15-17,19,20 and 22-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 09/29/2005.

#### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features "a plurality of high loss spans" and "a plurality of low loss spans" in the claims 1 and 27 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 12 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Tanaka et al (US Patent No. 6,324,317).

Regarding claims 1 and 31, referring to Figure 1, Tanaka discloses a method of compensating for chromatic dispersion in an optical signal transmitted on a long-haul terrestrial optical communication system including a plurality of spans (i.e., spans 4-1 to 4-n, Fig. 1), the method comprising:

allowing chromatic dispersion to accumulate over a plurality of spans in a transmission path (i.e., transmission path 4, Fig. 1), the transmission path (4, Fig. 1) including a plurality of high loss spans (i.e., single mode fibers SMF 4a, Fig. 1); and

identifying a plurality of non-periodically spaced low loss spans (i.e., RDF 4b, Fig. 1) in the transmission path, each of the low loss spans having an associated loss lower

than a loss associated with each of the high loss spans in the transmission path (see from col. 11, line 45 to col. 16, line 20);

compensating for dispersion accumulated on the plurality of spans using a plurality of separate dispersion compensating fibers (i.e., dispersion compensating fibers DCF 4c, Fig. 1), each of the dispersion compensating fibers (i.e., DCFs 4c, Fig. 1) being directly coupled to an associated one of the low loss spans (see from col. 11, line 45 to col. 16, line 20).

Regarding claim 12, Tanaka further discloses the signal is transmitted a distance of greater than 600 kilometers (Fig. 1).

5. Claims 1, 12 and 31 rejected under 35 U.S.C. 102(e) as being anticipated by Ma (US Patent No. 6,188,823).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1 and 31, referring to Figure 4, Ma discloses a method of compensating for chromatic dispersion in an optical signal transmitted on a long-haul terrestrial optical communication system including a plurality of spans (Fig. 4), the method comprising:

allowing chromatic dispersion to accumulate over a plurality of spans in a transmission path, the transmission path including a plurality of high loss spans (i.e., fibers 404, Fig. 4); and

identifying a plurality of non-periodically spaced low loss spans (i.e., fibers 402, Fig. 4) in the transmission path, each of the low loss spans having an associated loss lower than a loss associated with each of the high loss spans in the transmission path;

compensating for dispersion accumulated on the plurality of spans using a plurality of separate dispersion compensating fibers (i.e., dispersion compensating fibers DCF 405, Fig. 4), each of the dispersion compensating fibers (i.e., DCFs 405, Fig. 4) being directly coupled to an associated one of the low loss spans (see col. 3, lines 42-67 and col. 4, lines 1-38).

Regarding claim 12, Ma further discloses the signal is transmitted a distance of greater than 600 kilometers (Fig. 4).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US Patent No. 6,324,317) in view of Tanaka et al (US Patent No. 6,681,082).

Regarding claims 3 and 4, Tanaka further discloses at least one of the dispersion compensating fibers (i.e., DCF 4c, Fig. 1) is disposed between stages of a multi-stage optical amplifier.

Tanaka differs from claims 3 and 4 in that he fails to specifically teach the optical amplifiers are EDFA amplifier. However, Tanaka in US Patent No. 6,681,082 teaches the optical amplifiers are EDFA amplifier (Figs 1, 4 and 5, col. 12, lines 14-23).

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the optical amplifiers are EDFA amplifier as taught by Tanaka (US Patent 6,681,082) in the system of Tanaka (US Patent No. 6,324,317). One of ordinary skill in the art would have been motivated to do this since Tanaka suggests in column 12, lines 14-23 using such the optical amplifiers are EDFA amplifier have advantage of allowing increasing the optical power level of signal to a desired level.

Regarding claim 5, the combination of Tanaka and Tanaka (US 6,681,082) further discloses at least one of the dispersion compensating fibers is disposed in an amplifier following a relatively low loss one of the spans (Fig. 4 of Tanaka with US 6,681,082).

8. Claims 6, 7, 9, 20 and 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US Patent No. 6,324,317) in view of Sun et al (US Patent No. 6,417,961).

Regarding claims 6, 20 and 26-29, Tanaka teaches all the aspects of the claimed invention except fails to teach the dispersion compensating fibers is disposed between a Raman portion and an EDFA portion of a Raman/EDFA amplifier. However, Sun in US Patent No. 6,417,961 teaches the dispersion compensating fibers (i.e., DCF 28, Fig. 2) is disposed between a Raman portion (36, Fig. 2) and an EDFA portion (34, Fig. 2) of a Raman/EDFA amplifier (col. 3, lines 36-67 and col. 4, lines 1-64). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the dispersion compensating fibers is disposed between a Raman portion and an EDFA portion of a Raman/EDFA amplifier as taught by Sun in the system of Tanaka. One of ordinary skill in the art would have been motivated to do this since Tanaka suggests in column 3, lines 36-67 and col. 4, lines 1-64 using such the dispersion compensating fibers is disposed between a Raman portion and an EDFA portion of a Raman/EDFA amplifier have advantage of allowing increasing the optical power level of signal to a desired level, increasing the signal to noise ratio and compensating the dispersion of the signal.

Regarding claim 7, the combination of Tanaka and Sun discloses configuring a gain of the Raman portion to achieve a desired noise figure level for the Raman/EDFA amplifier (Fig. 2 of Sun).

Regarding claim 9, the combination of Tanaka and Sun discloses configuring a gain of the EDFA portion to achieve a predetermined total gain for the Raman/EDFA amplifier (Fig. 2 of Sun).



Regarding claim 25, Tanaka further discloses the signal is transmitted a distance of greater than 600 kilometers (Fig. 1).

9. Claims 11, 13, 16, 17 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US Patent No. 6,324,317) in view of Sun et al (US Patent No. 6,417,961) and further in view of Way et al (US Patent No. 6,366,728).

Regarding claims 11, 13, 17 and 24, Tanaka as modified by Sun teaches all the aspects of the claimed invention except fails to teach the EDFA portion of the Raman/EDFA amplifier is a single-stage EDFA. However, Way in US Patent No. 6,366,728 teaches the EDFA portion of the Raman/EDFA amplifier is a single-stage EDFA (Fig. 2, col. 10, lines 18-67 and col. 11, lines 1-6). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the EDFA portion of the Raman/EDFA amplifier is a single-stage EDFA as taught by Way in the system of Tanaka modified by Sun. One of ordinary skill in the art would have been motivated to do this since Way suggests in column 10, lines 18-67 and col. 11, lines 1-6 using such the EDFA portion of the Raman/EDFA amplifier is a single-stage EDFA have advantage of allowing increasing the optical power level of signal to a desired level, increasing the signal to noise ratio and compensating the dispersion of the signal and reducing cost of the whole system.

Regarding claim 16, Tanaka further discloses the signal is transmitted a distance of greater than 600 kilometers (Fig. 1).

*10.* Claims 8, 10, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable Tanaka et al (US Patent No. 6,324,317) in view of Sun et al (US Patent No. 6,417,961) and further in view of Friedrich (US Patent No. 6,466,362).

Regarding claims 8 and 22, Tanaka as modified by Sun differs from claims 8, 22, 23 and 32 in that he does not specifically teach the gain of the Raman portion is about 10-15dB. However, Friedrich in US Patent No. 6,466,362 teaches the gain of the Raman portion is about 10-15dB (col. 7, lines 5-7). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the gain of the Raman portion is about 10-15dB as taught by Friedrich in the system of Tanaka modified by Sun. One of ordinary skill in the art would have been motivated to do this since Friedrich suggests in column 7, lines 5-7 that using such the gain of the Raman portion is about 10-15dB have advantage of allowing minimizing the noise figure for a plurality of different span losses.

Regarding claims 10 and 23, the combination of Tanaka, Sun and Friedrich teaches the gain of the EDFA portion is about 5-15 dB (col. 7, lines 5-7 of Friedrich).

*//.* Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable Tanaka et al (US Patent No. 6,324,317) and Sun et al (US Patent No. 6,417,961) in view of Way et al (US Patent No. 6,366,728) and further in view of Friedrich (US Patent No. 6,466,362).

Regarding claims 15 and 19, the combination of Tanaka, Sun and Way differs from claims 15 and 19 in that he does not specifically teach the gain of the Raman

Art Unit: 2638

portion is about 10-15dB and the gain of the EDFA portion is about 5-15 dB. However, Friedrich in US Patent No. 6,466,362 teaches the gain of the Raman portion is about 10-15dB and the gain of the EDFA portion is about 5-15 dB (col. 7, lines 5-7).

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the gain of the Raman portion is about 10-15dB and the gain of the EDFA portion is about 5-15 dB as taught by Friedrich in the system of The combination of Tanaka, Sun and Way. One of ordinary skill in the art would have been motivated to do this since Friedrich suggests in column 7, lines 5-7 that using such the gain of the Raman portion is about 10-15dB and the gain of the EDFA portion is about 5-15 dB have advantage of allowing minimizing the noise figure for a plurality of different span losses.

*12.* Claims 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable Tanaka et al (US Patent No. 6,324,317).

Regarding claims 30 and 32, it would have been obvious to obtain the loss associated with the high loss spans is between about 15-25dB, and the loss associated with low loss spans is between about 5-15dB in order to provide overall improved performance such as an improved data rate and bandwidth, across a range of optical signal wavelengths while still maintaining acceptable or minimal levels of chromatic dispersion.

***Response to Arguments***

- 13.* Applicant's arguments with respect to claims 1, 3-13, 15-17, 19, 20 and 22-32 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

- 14.* Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (571)272-3035.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye, can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

  
**HANH PHAN**  
**PRIMARY EXAMINER**